

Department of Mechanical Engineering
LEHIGH UNIVERSITY
Bethlehem, Pennsylvania

SUBJECT: Third Semi-Annual Progress Report

REPORT PERIOD: September 1, 1964 through June 1, 1965

GRANT: N.A.S.A. Nsg 410 - Theoretical and Experimental
Investigations of Fatigue Crack Growth

PRINCIPAL INVESTIGATOR: Dr. Paul C. Paris

A. INTRODUCTION

During the period of this report the principal investigator, Dr. Paris, has been on leave from Lehigh University as explained in the previous progress report and correspondence with N.A.S.A. During the period Dr. Paris has made monthly trips to Lehigh to direct the technical aspects of the work. Dr. F. P. Beer, Head of Mechanics, has acted as administrator of this grant during the period.

The work has progressed as originally planned (see last report) without difficulty. This is evident from the fact that both research assistants have completed the phases of the work, part of which formed the thesis of each, and received their degrees (one M.S., one Ph.D.).

B. RESULTS TO DATE

In addition to the reports previously transmitted (and noted in the last report) the following new publication was transmitted to N.A.S.A.

"Stress Analysis of Cracks" by P. Paris and G. Sih, as reprinted from, Fracture Toughness Testing, A.S.T.M. Spec. Tech. Pub. No. 381, 1965, p.p. 30-83.

FACILITY FORM 602	N65-86978	
	(ACCESSION NUMBER)	(THRU)
	<u>4</u>	<u>None</u>
	(PAGES)	(CODE)
	<u>CR-64158</u>	
	(NASA CR OR TMX OR AD NUMBER)	(CATEGORY)

Moreover, Dr. Richard Hertzberg submitted his Ph.D. dissertation "Application of Fractography and Fracture Mechanics to Fatigue Crack Growth in High Strength Aluminum Alloys" and Mr. Barry Linder his M.S. dissertation "Extremely Slow Crack Growth Rates in Aluminum Alloy 7075-T6 which will be the subjects of reports to be transmitted to N.A.S.A. under this grant at an early date. Submission of portions of this work for publication is anticipated soon. (The advisability of releasing some of it as an N.A.S.A. technical note or report is being reviewed with the grant monitor).

The work will continue as noted in the previous report.

C. COMMUNICATION WITH THE GRANT MONITOR

The grant monitor (and/or representatives of his staff have met with the principal investigator and discussed grant work on the following occasions during this report period:

- (1) November 1964 in Washington, D. C.
- (2) January 1965 in Washington, D. C.
- (3) April 1965 in Washington, D. C.

Many additional telephone conversations, etc. have kept communication at an adequate level.

D. FUNDING AND DURATION

Since Dr. Paris was not drawing upon grant funds for salary during this period, the expenditures under the grant were somewhat less than the nominal rate. His return during the remaining grant period and a slight increase in the effort will offset this current extra balance. Therefore the grant balance will be appropriately adequate to complete the work anticipated at a total cost of very near to the grant budget in approximately the grant scheduled period.

Paul C. Paris

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Principal Investigator